AIUB-RL02 monthly gravity field solutions from GRACE kinematic orbits and range-rates

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GSTM

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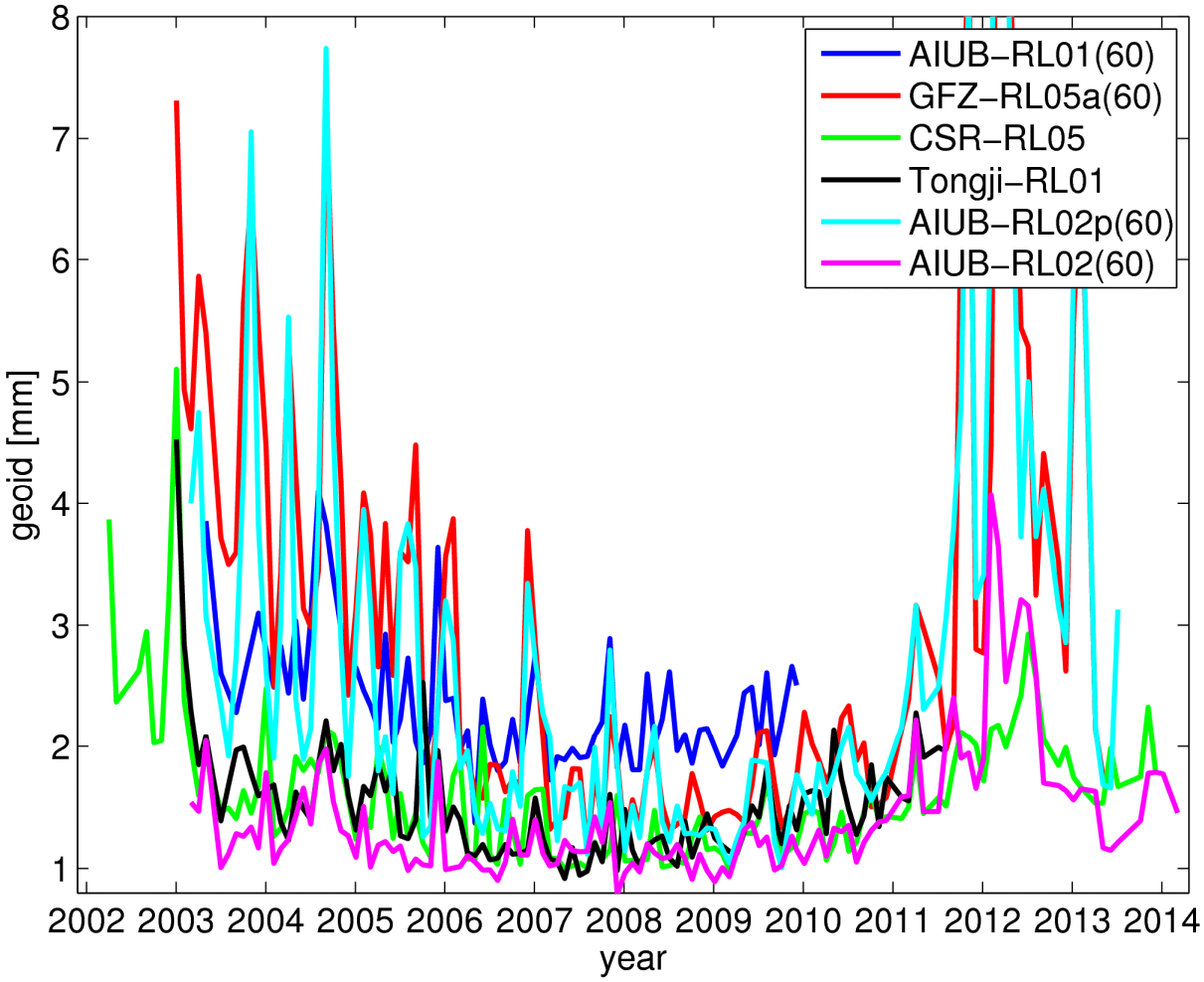
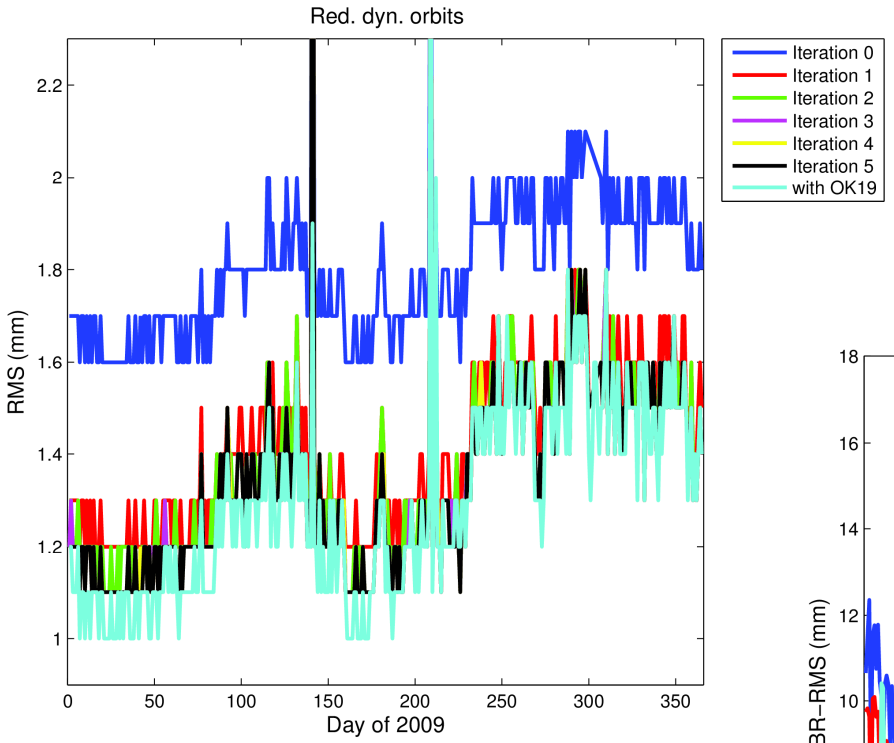
AIUB-RL02 monthly gravity models

- IERS conventions 2010 (IGS08; igs08.atx)
  - estimation of new phase center variations
  - reprocessing of kinematic orbits
- L1B-RL02 data
- Atmosphere/Ocean-dealiasing AOD1B-RL05
- Ocean tide modell: EOT11a
  - inclusion of secondary waves (admittances)
- K-Band attitude correction
- ACC scale factors

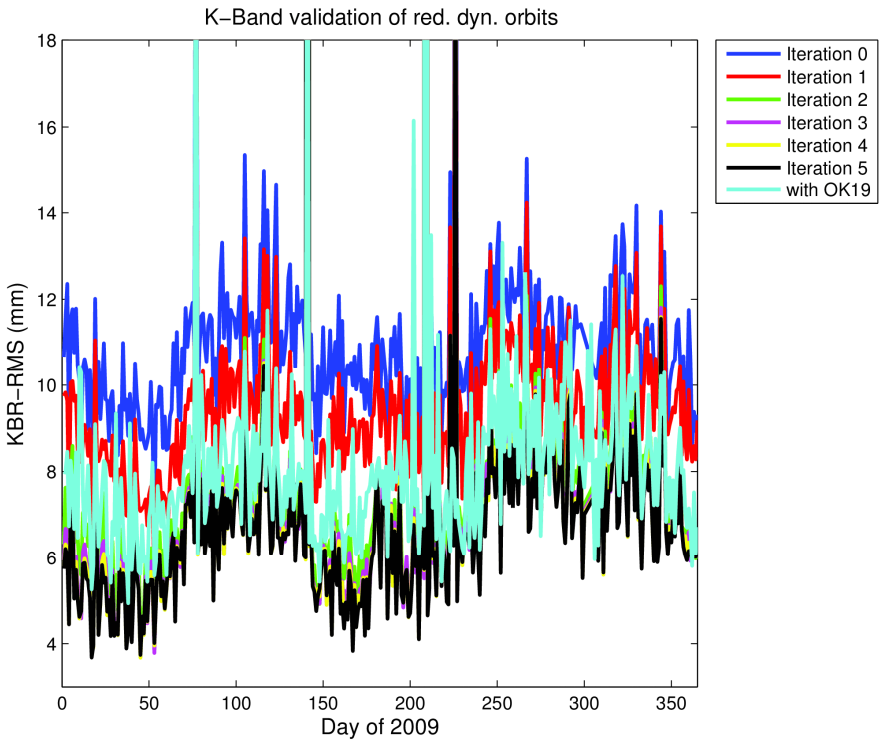
Noise (wSTD over oceans)



IERS (2010): new phase center variations



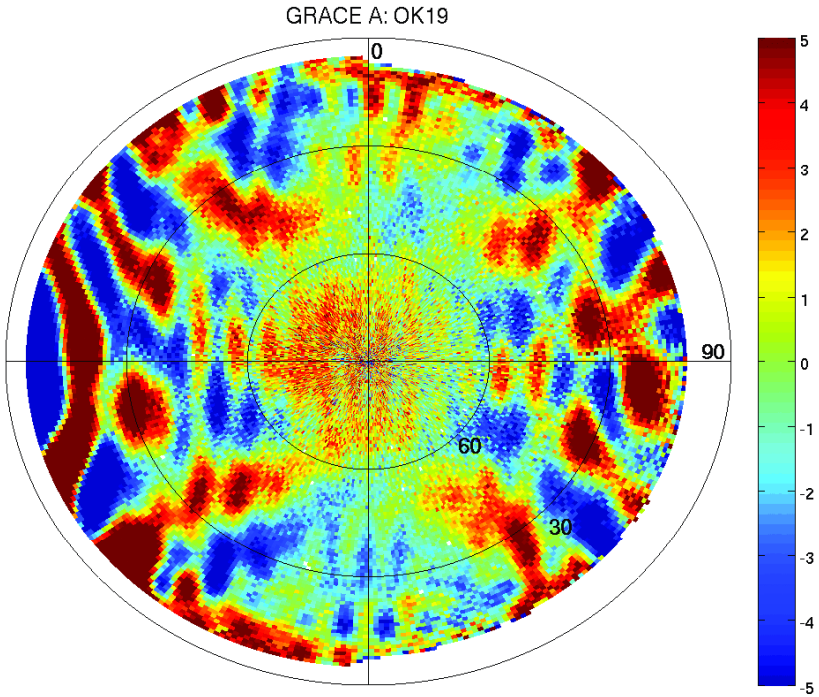
Consistency of old orbits was better (9 iterations) ...



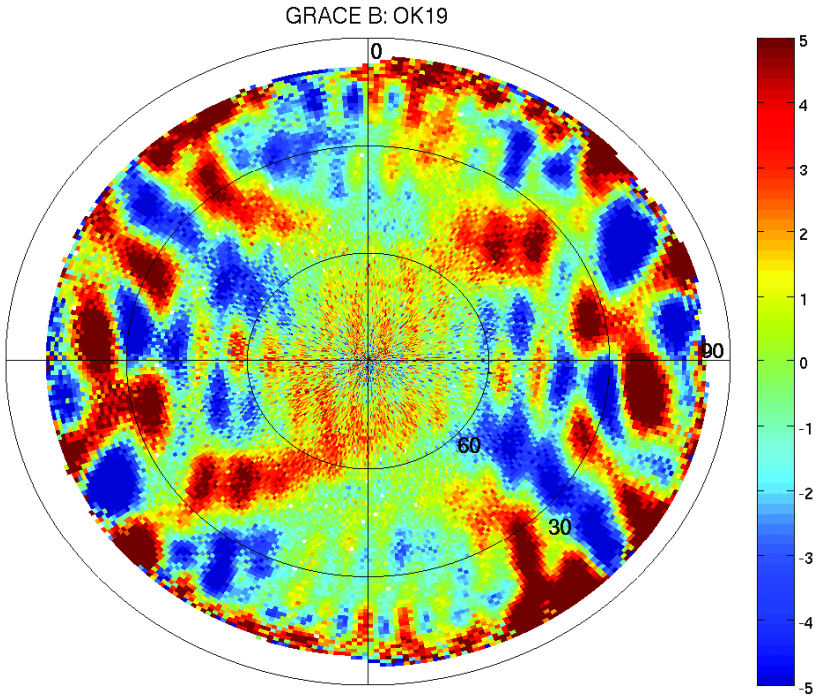
... but quality of new orbits is higher!

Old phase center variations: IERS 2003

GRACE A (RL01)



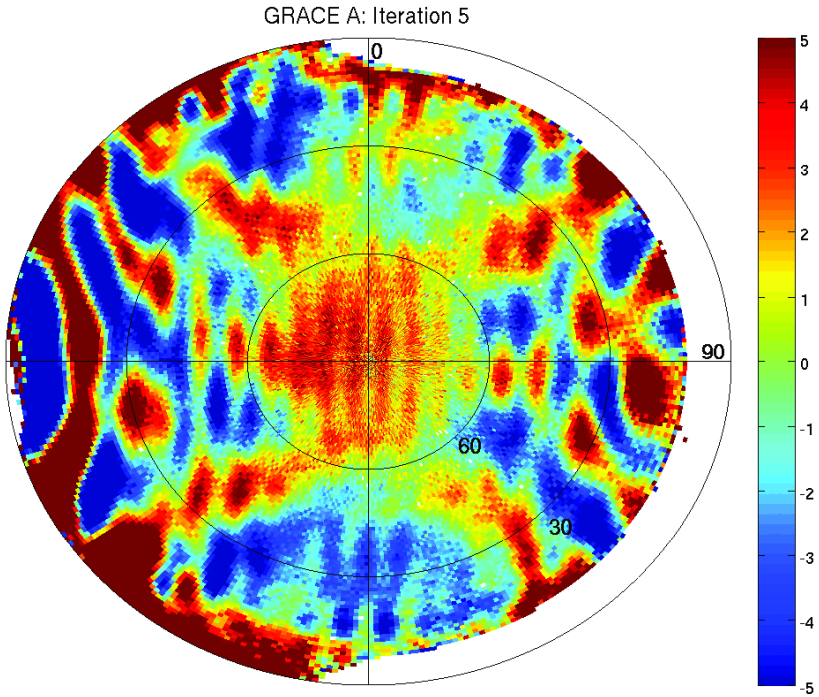
GRACE B (RL01)



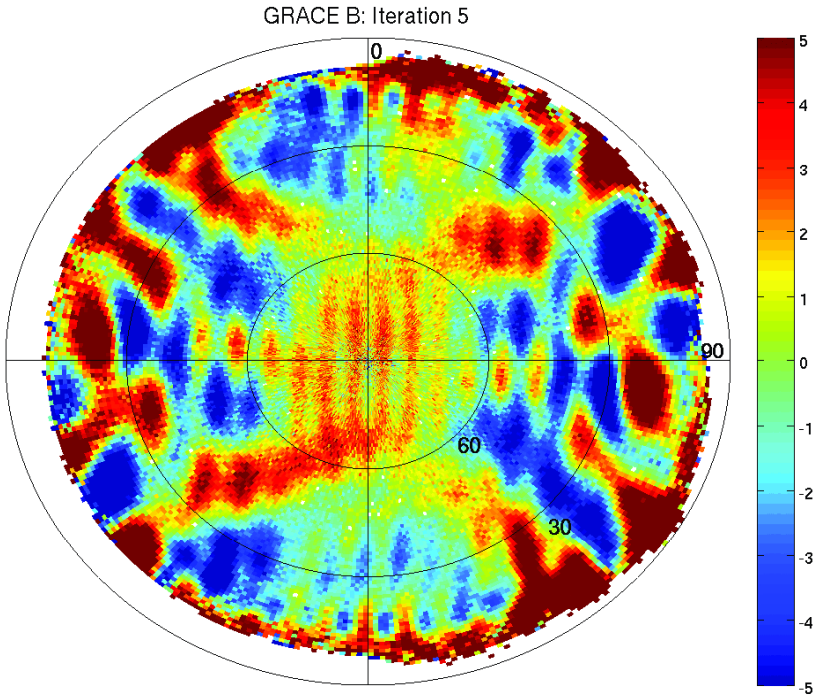
Elevation cut-off 5°

New phase center variations: IERS 2010

GRACE A (RL02)



GRACE B (RL02)

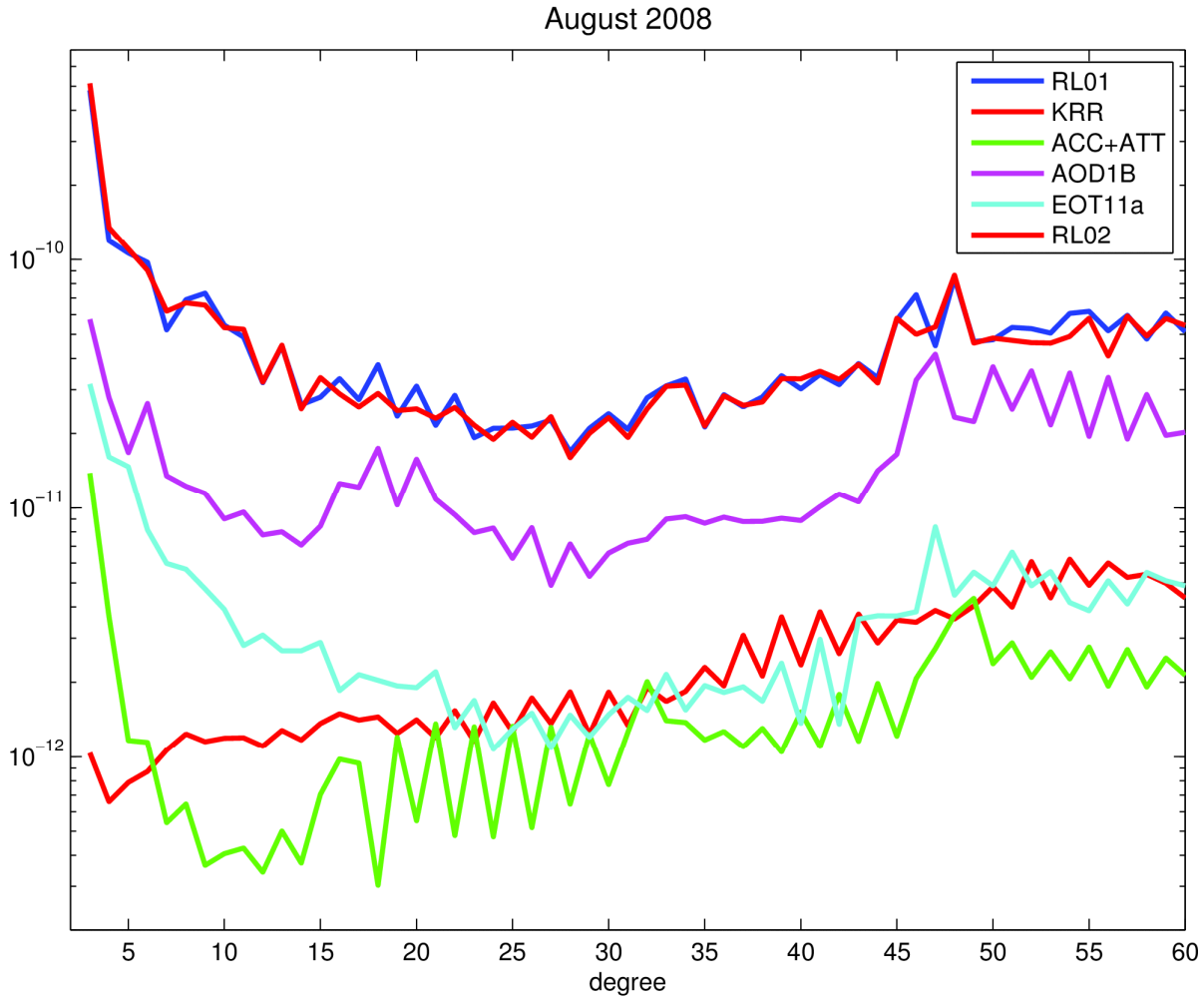


Elevation cut-off 0°

Effect of new kinematic orbits on gravity field:

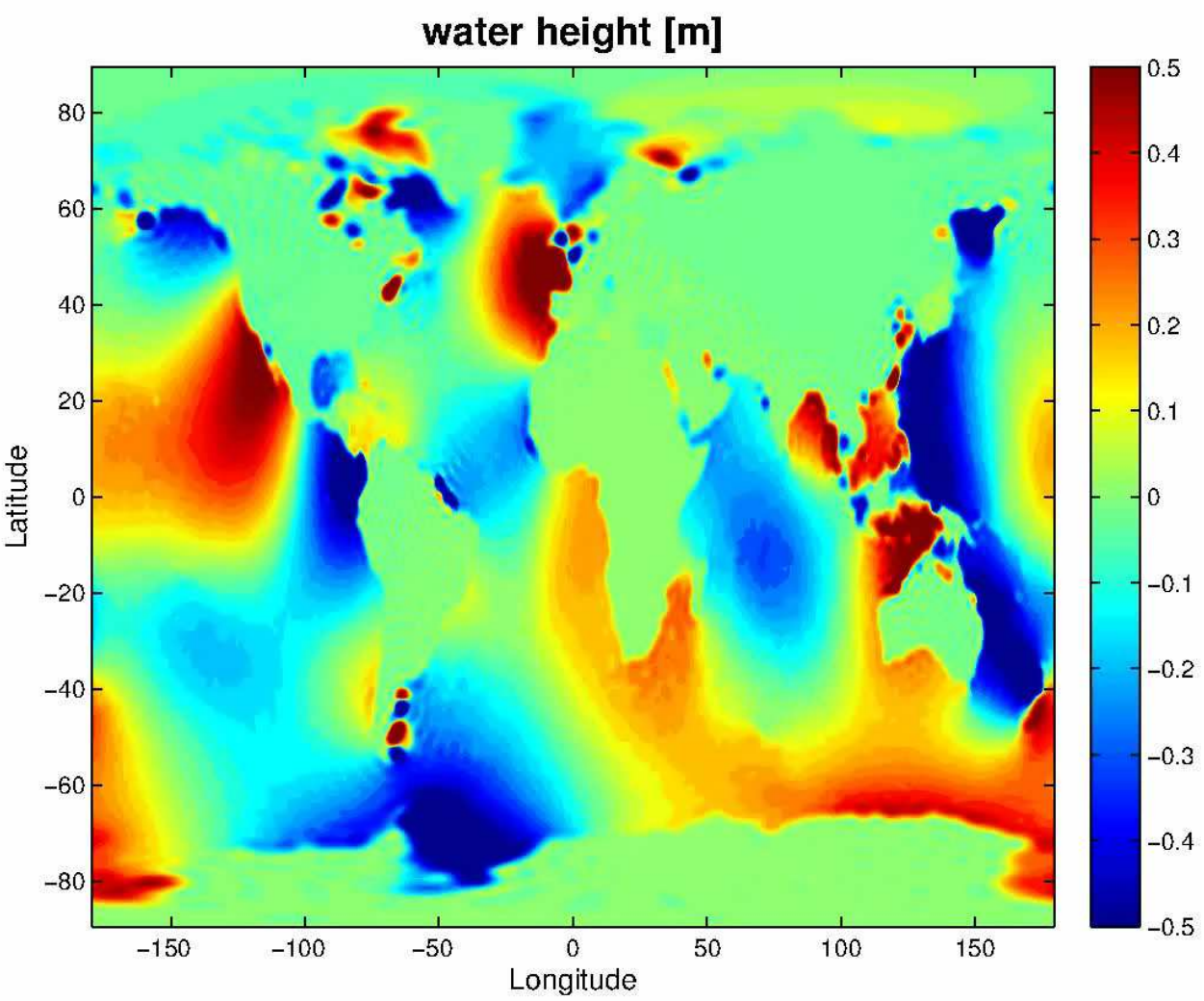
... negligible

Effect of L1B-RL02 and model updates

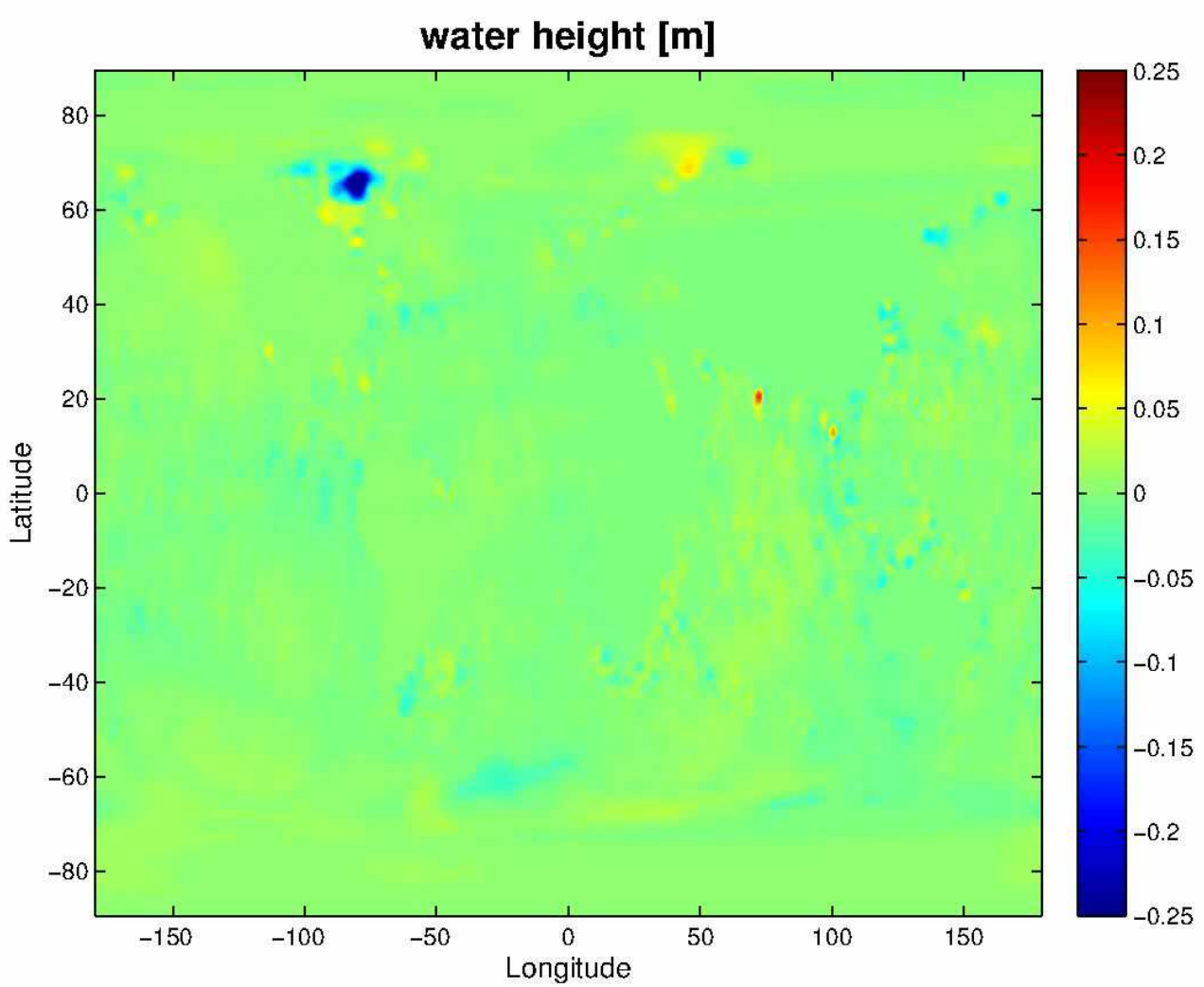


None of the data or model updates causes a significant gain in consistency.

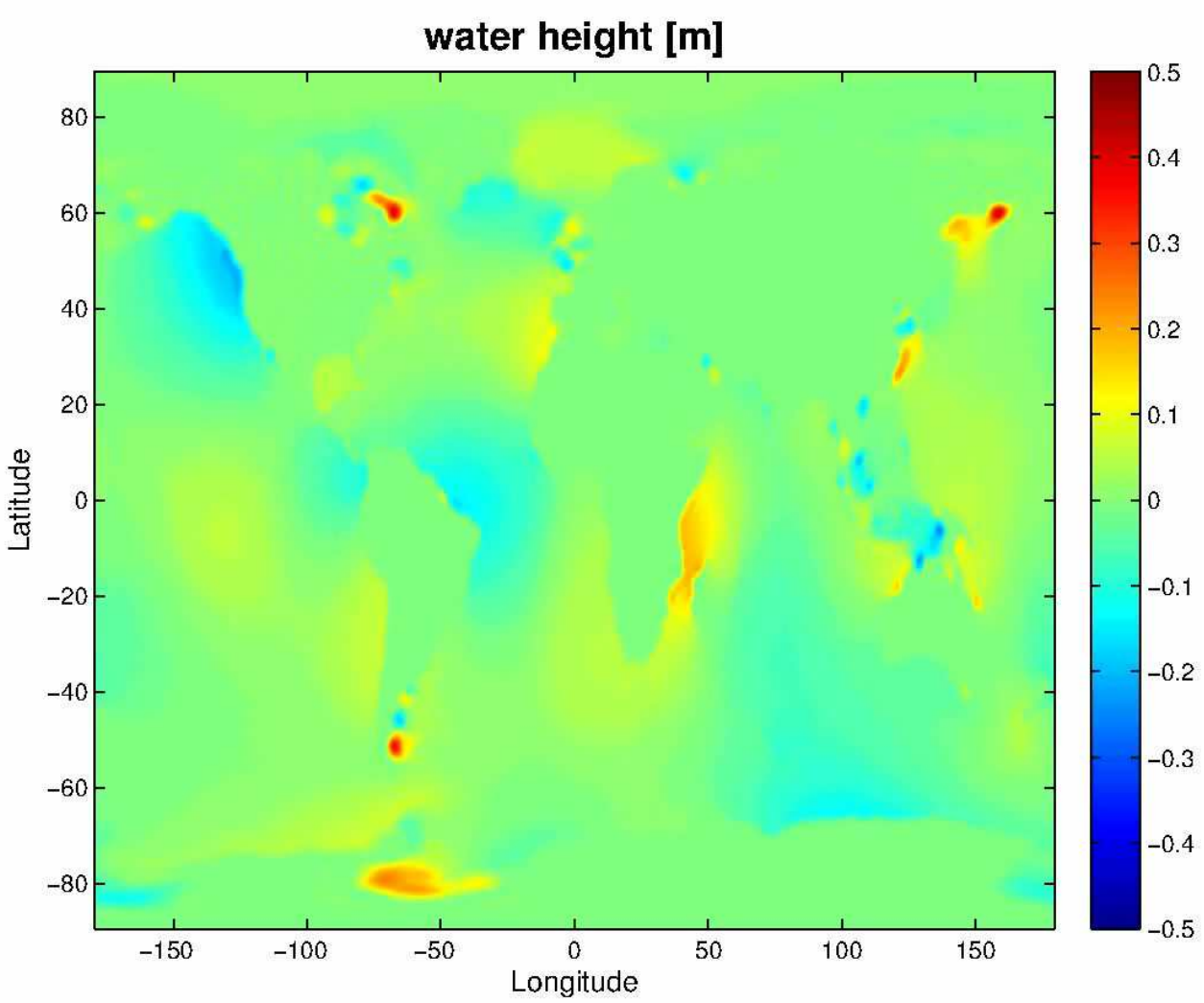
Ocean tide model: EOT11a – main tides



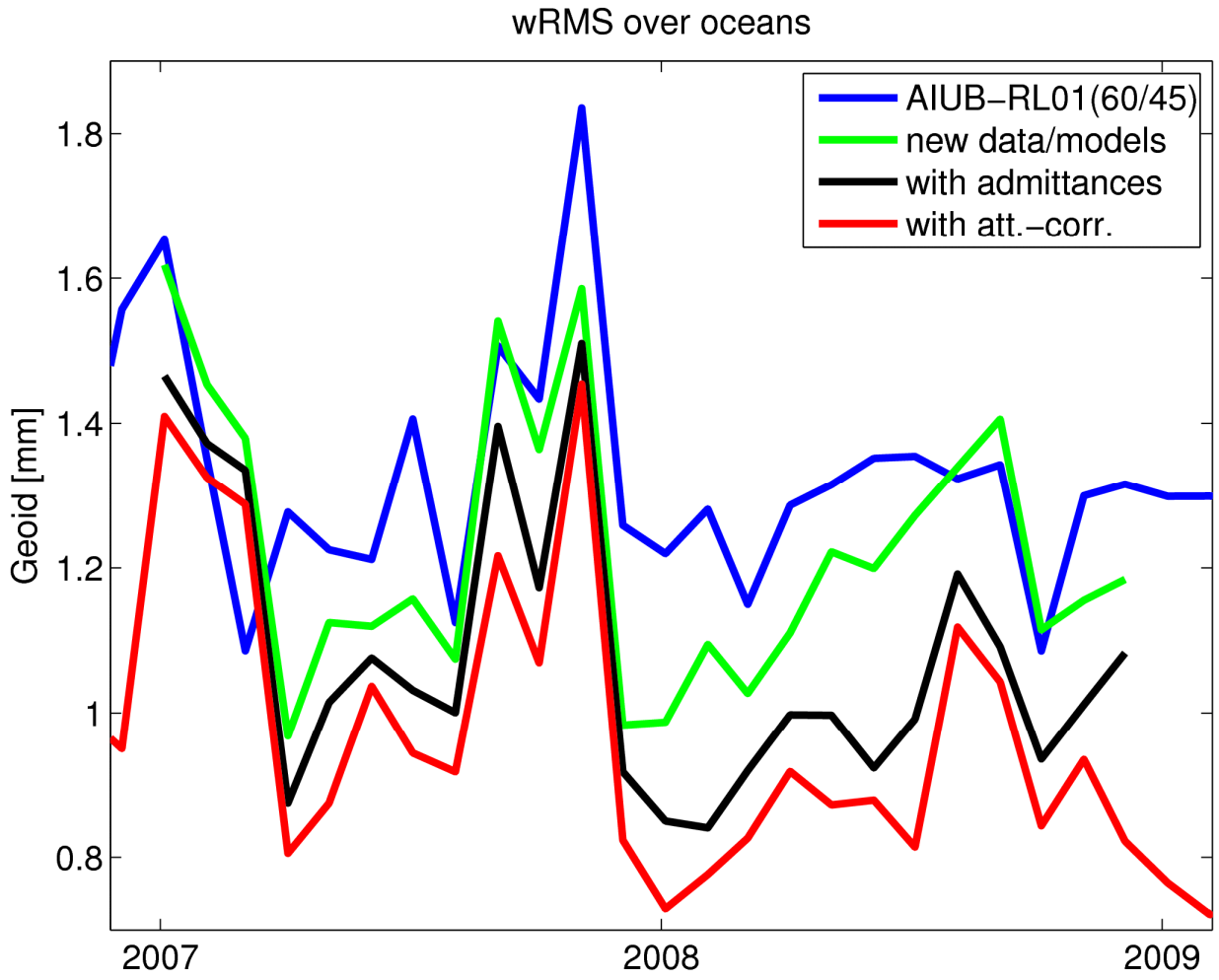
Ocean tide model: EOT08a – EOT11a



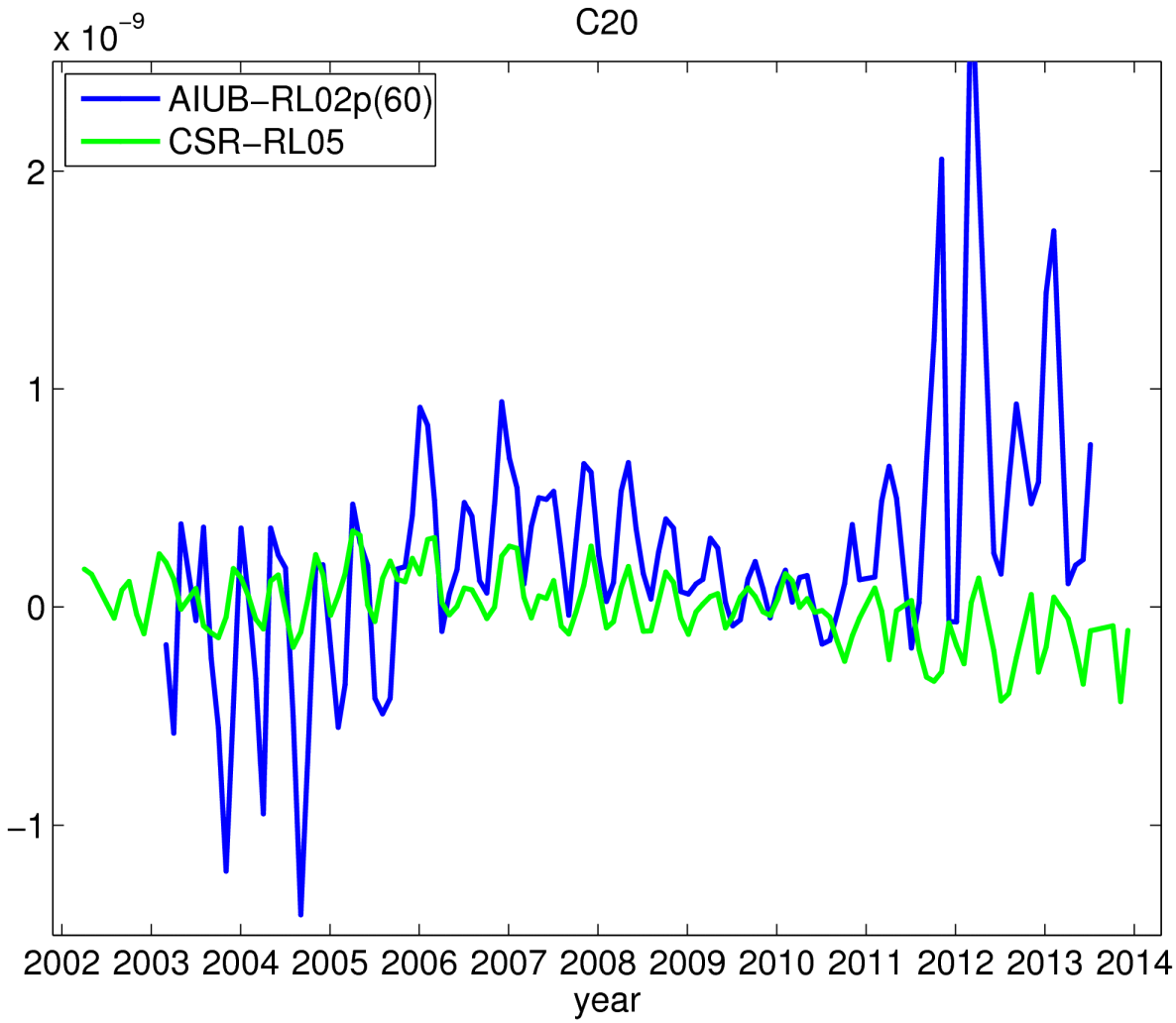
Ocean tide model: EOT11A – secondary tides



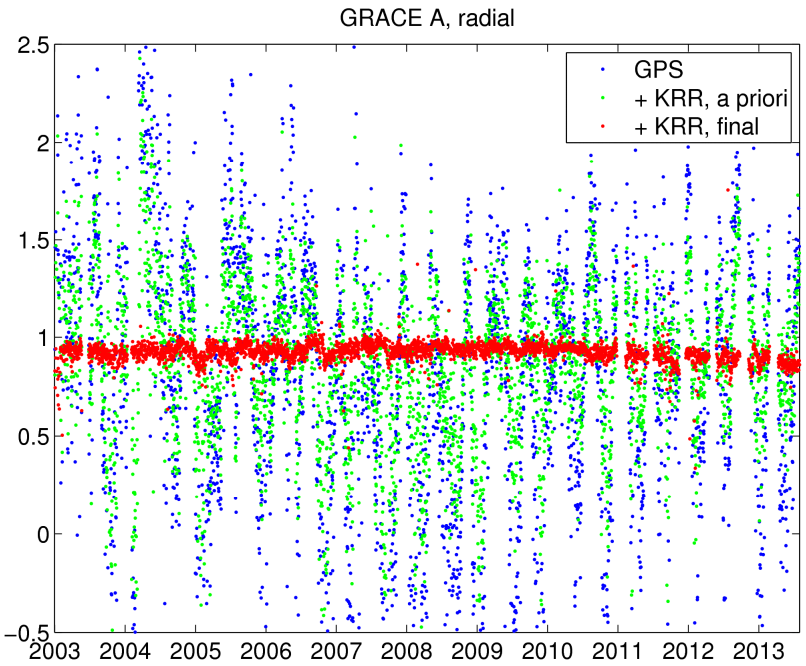
Intermediate result AIUB-RL02p



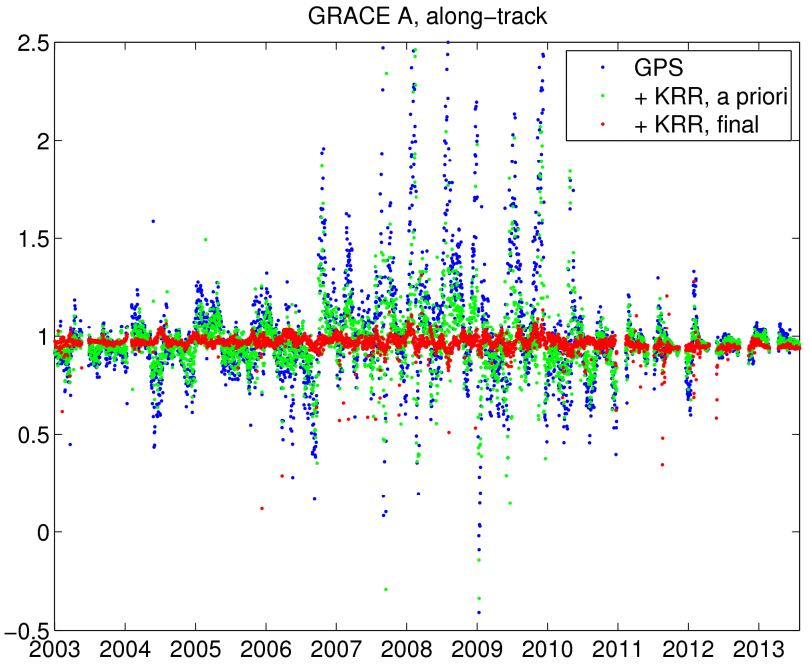
Problem: C20


C20
x 10^-9
AIUB–RL02p(60)
CSR–RL05
2
1
0
−1
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
year

Daily ACC scale-factors

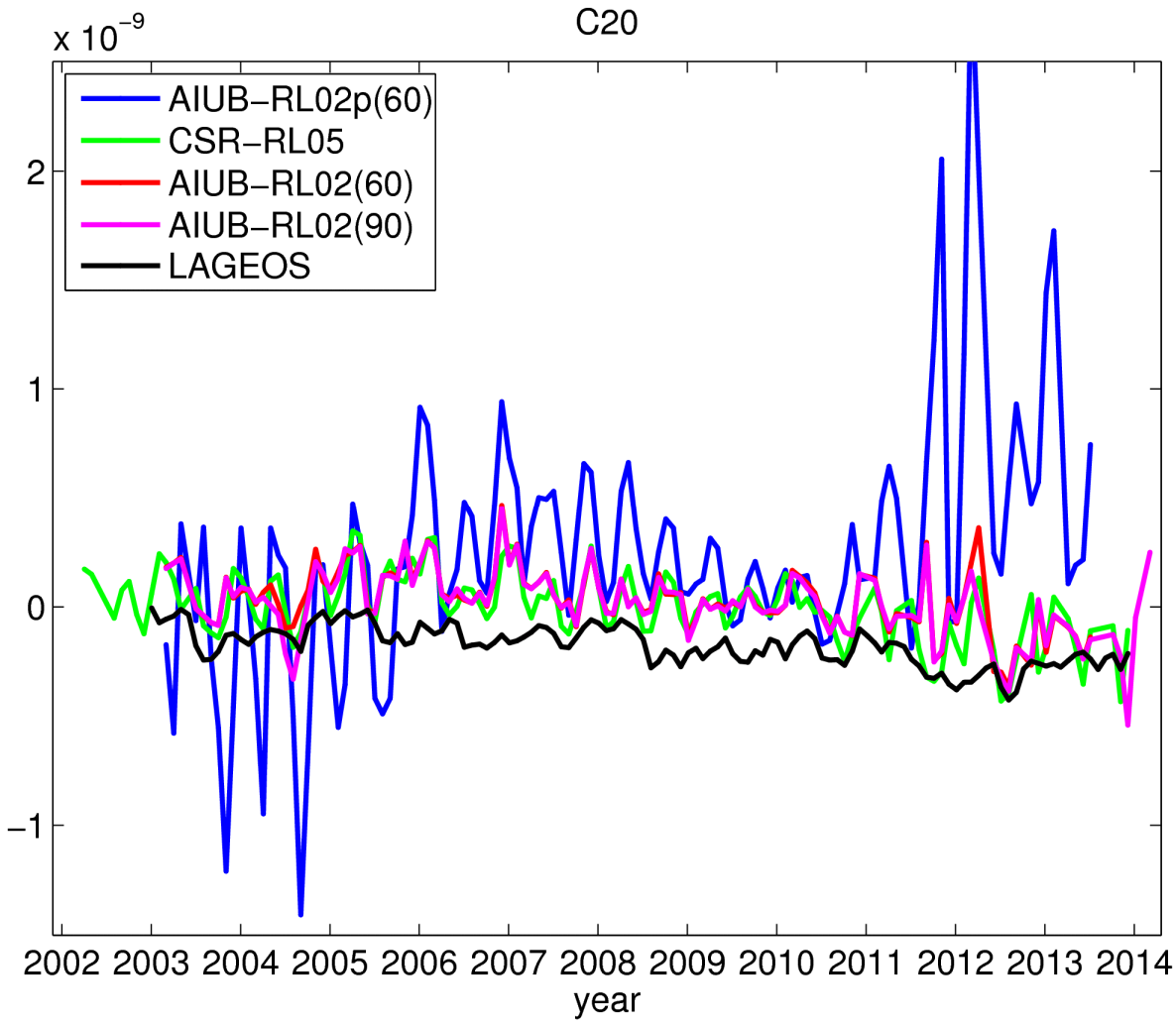


KRR enables a stable estimation of ACC scale- factors in radial and along-track.

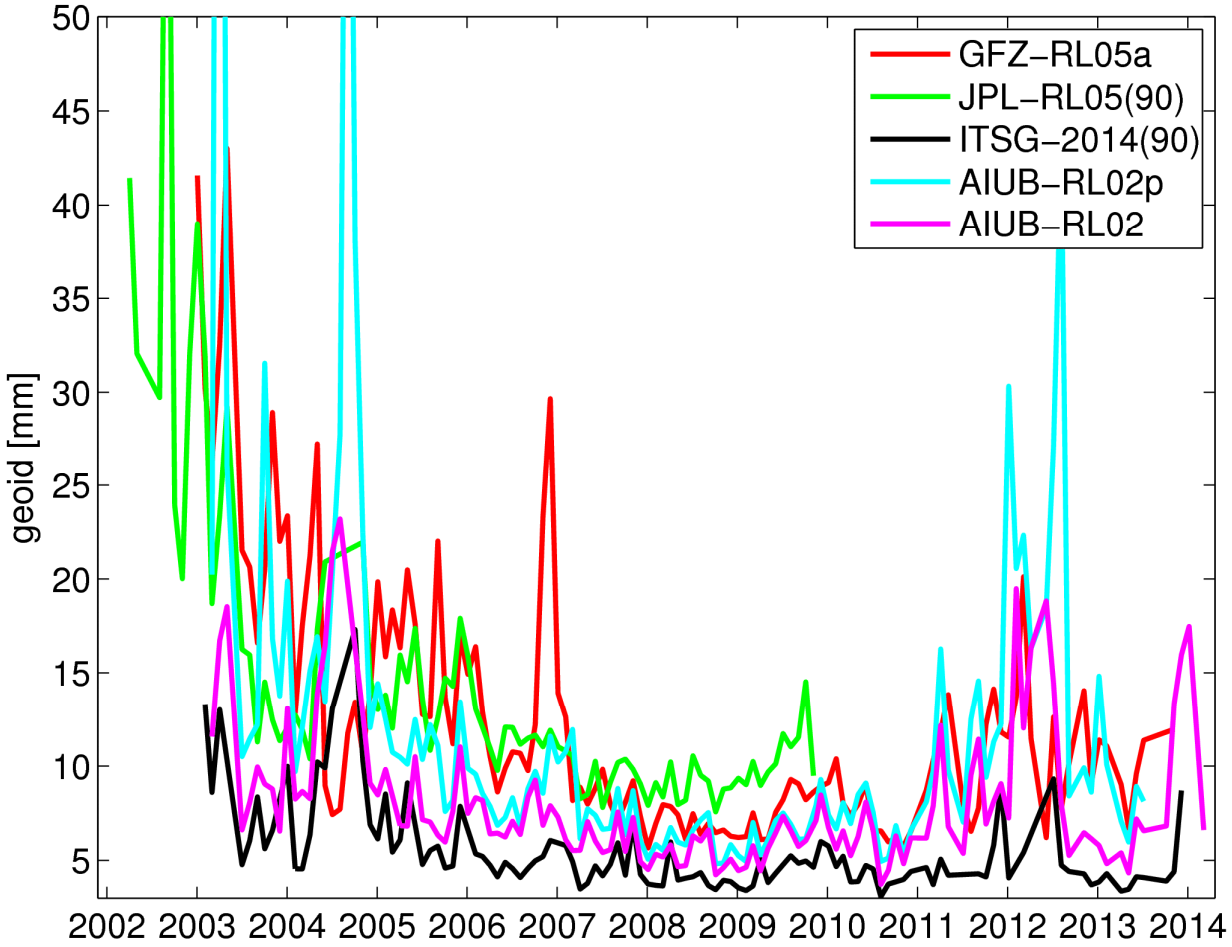


The along-track ACC scale-factors are estimated more stable during times of high solar activity.

C20 without /with daily ACC-Scales



Noise (wSTD over oceans)



Max. degree 60 versus 90